Electrophysiologic Evaluation for Brain Dysfunction

IN ADDITION TO passive electroencephalography, activated brain electrical responses to sensory stimulation and cognition can now be recorded. Responses emerge as stimulus or as event-related evoked-potential small microvolt patterns buried in larger microvolt electroencephalographic patterns. To extract evoked-potential patterns, stimulation is presented repeatedly and responses averaged. Background electrical "noise" essentially cancels out, and unique brain patterns can be elicited and analyzed. Different patterns are obtained for different sensory modalities, different neuropsychological tasks, and different physical and psychiatric conditions. Auditory and somatosensory stimulation provides information on brain-stem, subcortical, and cortical responsivity. Visual stimulation provides information on retinal responsivity, transmission through visual pathways, and cortical responsivity.

Electrical potentials have known latencies and central conduction times between different central nervous system relay stations. In the auditory system, for example, certain brain-stem delays can indicate an acoustic neuroma or the effects of alcoholism. Important qualitative data can be obtained. In comatose or near-comatose victims, it is possible to evaluate the functioning not only of the ears and eyes, but of the upper and lower extremities and the spinal cord with respect to ability to transmit afferent somatosensory information. It is also possible to assess the extent and degree of abnormality of cortical responses in different regions of the brain.

Multisensory evoked-potential patterns can be read reliably and yield evoked-potential scores indicating an abnormality. Such scores are correlated significantly with cortical dysfunction, cognitive and behavioral clinical impairments, and, to a lesser degree, with prognosis after severe brain injury. Evoked potentials can be used as a tool in neuropsychiatric assessment to help differentiate organic from functional disorders. Mapping brain electrical activity topographically and comparing the results statistically with normative data is another method of assessing central nervous system dysfunction associated with physical, psychiatric, and psychophysical conditions.

A case of suspected conversion disorder involving reportedly sudden hearing loss was shown definitely by evoked-potential testing to be a neurophysiologic and not a psychological problem. Another case involving an industrial injury in which a blow to the side of the head was reported to have caused a peripheral hearing impairment was shown to be an incident of malingering. Another case of psychological blocking and cognitive impairment thought initially to be caused by psychological trauma was shown by electrophysiologic finding to be more closely associated with a dysfunctional brain disorder compatible with an organic brain syndrome.

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Prophylaxis of Antipsychotic Drug-Induced Extrapyramidal Syndromes

IN THE PAST, the psychiatric literature contained a virtual prohibition against the use of anticholinergic drugs before the onset of neuroleptic-induced extrapyramidal syndromes. Some controversy continues today regarding the risks and benefits of the prophylactic use of anticholinergics. Recent studies indicate, however, that this use of anticholinergic drugs and perhaps other drugs to counteract extrapyramidal syndromes should be considered for some patients. Several reasons are given for prophylaxis: First, these syndromes cause pain, discomfort, and incoordination. Laryngeal or pharyngeal dystonia may jeopardize life. Patients may refuse to take antipsychotic drugs or leave the hospital before the completion of treatment when experiencing these side effects. Preventing the neurologic side effects of antipsychotic drugs helps reduce morbidity and ensure patient compliance. Second, some side effects can exacerbate or mimic the symptoms of schizophrenia, leading to inappropriate treatment. Akathisia, for example, can cause patients to appear to be more psychotic. Left untreated, drug-induced parkinsonism and akathisia can make a normal social life and adequate job performance impossible, defeating efforts at psychosocial rehabilitation.

The benefits of prophylaxis for extrapyramidal syndromes must be weighed against the risks. Anticholinergic and other medications to treat these disorders are not benign; undesirable effects include blurred vision, dry mouth, and constipation. Impairment in short-term memory may be common even with therapeutic doses. In rare cases, complications as severe as urinary retention or delirium may result.

Five studies published since 1983 involving a total of 330 patients treated with high-potency antipsychotic drugs have shown that anticholinergic agents are effective in preventing dystonia in the first week of treatment. On average, patients not receiving prophylaxis in these studies were 5.4 times more likely to suffer dystonia than were those who were. In some of these investigations, drug-induced parkinsonism was studied and shown to be prevented or reduced during the treatment of acute episodes when prophylaxis was used. Data on akathisia are less certain, perhaps because the most effective therapies for akathisia, β-blocking agents such as propranolol hydrochloride, have only recently come into common use and have not been studied for prophylaxis.

Care should be taken in selecting patients for prophylaxis against extrapyramidal syndromes. In judging the likelihood of an extrapyramidal syndrome developing, several factors should be considered. A recent study of multiple treatment episodes in schizophrenic patients concluded that patients with a history of extrapyramidal syndromes are at greater risk for future episodes and that this predisposition outweighed other risk factors. In that investigation, history was an accurate predictor of a future occurrence of the syndrome in 84% of patients. Age is a significant risk factor. Younger patients treated with neuroleptic agents are more likely to have dystonic reactions than older patients. Middle-aged patients may be more susceptible to the occurrence of akathisia. More recent data show that young, as well as older, patients are also in danger of drug-induced parkinsonism.

The dosage and potency of the antipsychotic medication must be considered as well. Patients treated with high-potency drugs such as haloperidol are at a higher risk for

extrapyramidal syndromes than those treated with low-potency agents such as thioridazine. Low doses of neuroleptic agents generally lower the incidence and severity of the disorders. Dystonia, unfortunately, can appear at low antipsychotic doses and may be recurrent so that, even at low antipsychotic doses, prophylaxis may be needed.

Several circumstances may make the development of extrapyramidal syndromes especially undesirable. Paranoid patients for whom the therapeutic relationship is tenuous are one example. The development of these syndromes would be particularly harmful in patients requiring orthopedic devices such as neck braces or casts. These considerations should enhance the prescribing of prophylaxis. On the other hand, this prophylaxis is relatively contraindicated in patients who may be harmed by anticholinergic side effects such as impaired recent memory. Older patients receiving low-potency antipsychotic agents are unlikely to benefit from prophylaxis. Patients with deficits in short-term memory from head trauma, dementias, and other causes are not good candidates for prophylaxis as they are more likely to suffer further memory impairment and may become delirious.

The withdrawal of prophylactic medication should be attempted after the initial treatment has been completed if the patient is free of symptoms and the antipsychotic regimen has been stabilized. Studies have shown that some patients will have recurrent episodes and deterioration of mental status when anticholinergic therapy is withdrawn. For this reason, the withdrawal of prophylactic agents should be gradual and carefully monitored.

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Panic Disorder

THOUGH PANIC DISORDER and panic disorder with agoraphobia or phobic avoidance (PDA) are common (the mean lifetime prevalence of panic disorder is 1.5%), the diagnosis is frequently missed: 70% of patients with PDA in one large study had more than ten medical consultations before receiving the correct diagnosis and treatment.

The "classic" presentation of panic disorder consists of sudden, unexpected, discrete attacks of intense fear or discomfort without a recognizable precipitant, accompanied by at least four of the following symptoms during at least one of the attacks: dyspnea or smothering sensations; dizziness, unsteadiness, or faintness; palpitations or tachycardia; trembling or shaking; sweating; choking; nausea or abdominal distress; depersonalization or derealization; numbness or paresthesias; flushes or chills; chest pain or discomfort; fear of dying; and fear of going crazy or doing something uncontrolled. Panic disorder, however, frequently occurs with symptoms referable to only a single organ system. Such single system presentations include chest pain and dyspnea (33% to 59% of patients seen because of chest pain but with no abnormalities found on coronary angiography were found in three different studies to have PDA); balance disorder ("dizziness") without true vertigo (25% to 50% of patients seen because of vestibular disorder symptoms have a subtype of panic disorder); abdominal discomfort, pain, and diarrhea (about 33% of patients seen by gastroenterologists were found to have PDA).

Large-scale clinical studies have shown that for most patients, PDA is a chronic relapsing disorder. Multiple family and twin studies show that panic disorder has a highly familial transmission with a strong genetic component (31% monozygotic concordance, 0% dizygotic concordance).

Panic disorder with agoraphobia has a startlingly high comorbidity and mortality. Patients with untreated PDA attempt suicide at a rate equivalent to that of patients with major depression (15% to 20% of patients). This disorder has a dramatically high incidence of comorbid major depression, alcohol abuse, substance abuse, other anxiety disorders, multiple phobias or agoraphobia, cardiovascular disease, and personality disorders. Patients with PDA experience substantially more impairment in social, family, and occupational functioning than the general population.

The proven standard of effective treatment for PDA continues to be pharmacotherapy to stop and prevent recurrent panic attacks, plus behavior therapy (exposure in vivo) for any phobic avoidance that may remain once the panic attacks have been stopped. Most clinical studies have found the first-generation tricyclic antidepressants, the monoamine oxidase inhibitors, and two of the benzodiazepines (alprazolam [Xanax] and clonazepam [Klonopin]) highly effective in stopping and preventing recurrent panic attacks when maintained at therapeutic blood concentrations. Of the newer antidepressant medications, fluoxetine (Prozac) and clomipramine hydrochloride (Anafranil) have demonstrated efficacy in PDA, whereas buproprion hydrochloride (Wellbutrin) and the nonbenzodiazepine anxiolytic buspirone hydrochloride (BuSpar) have not.

The goal of appropriate pharmacologic management is the complete absence of all panic and subpanic attacks. This can be achieved with a single medication in more than 85% of patients, though it may take several treatment trials to find the best medication. Refractory cases may require more complicated protocols.

Recent reports of two nonpharmacologic treatments, cognitive therapy and cognitive-behavioral therapy, show promise for some patients with PDA.

The core of cognitive-behavioral treatment is systematic structured exposure to the feared internal sensations, coupled with cognitive procedures to restructure anxiety-provoking thoughts, catastrophic misinterpretations, and faulty core beliefs. The therapist directs the patient to induce the somatic sensations typical of a panic attack (dizziness, tachycardia, dyspnea, chest tension) in the office (by having the patient spin around, run in place, hyperventilate, or contract chest muscles tightly), while together therapist and patient critically examine the symptom experience, correct the patient's frightening and catastrophic cognitive misinterpretations of the sensations, and control the symptoms with a variety of relaxation techniques. The patient practices at home what is learned in the office and keeps a daily diary of symptoms, reflex cognitive distortions, and corrective thinking and behavior.

Reports of the nonpharmacologic treatment of PDA to date review small treatment populations and short follow-up